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GB 2377592 A JP 2002314657 A
JP 2002198849 A JP 2002171324 A
KR 010028987 A

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(54) Abstract Title: Foldable mobile phone having display and keyboard on external surfaces

(57) A foldable information technology device, in particular a mobile telephone or a Personal Digital Assistant, comprises a keyboard KB and a display DP that are arranged on opposite external surfaces of two parts of the casing of the device. When the two parts of the casing are folded up with a hinge 101, the device assumes a more compact form but the display DP and keyboard KB remain accessible to the user. A camera C may be arranged on a second part of the casing so that the display DP and camera C are on opposite exterior surfaces when folded up. An earpiece (E fig.3) and microphone (M fig.3) are accommodated on internal surfaces of the device.

Fig. 1

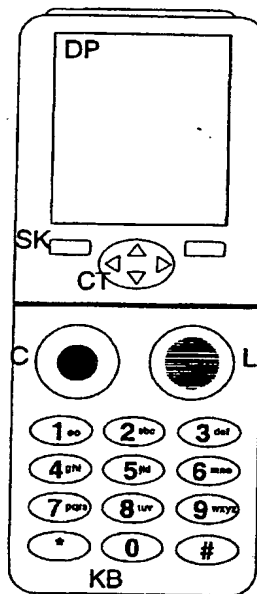
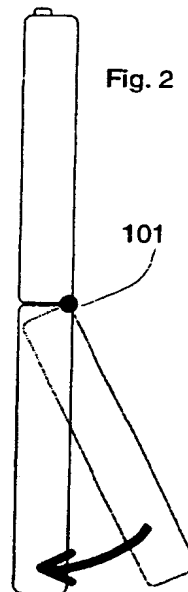


Fig. 2



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Fig. 1

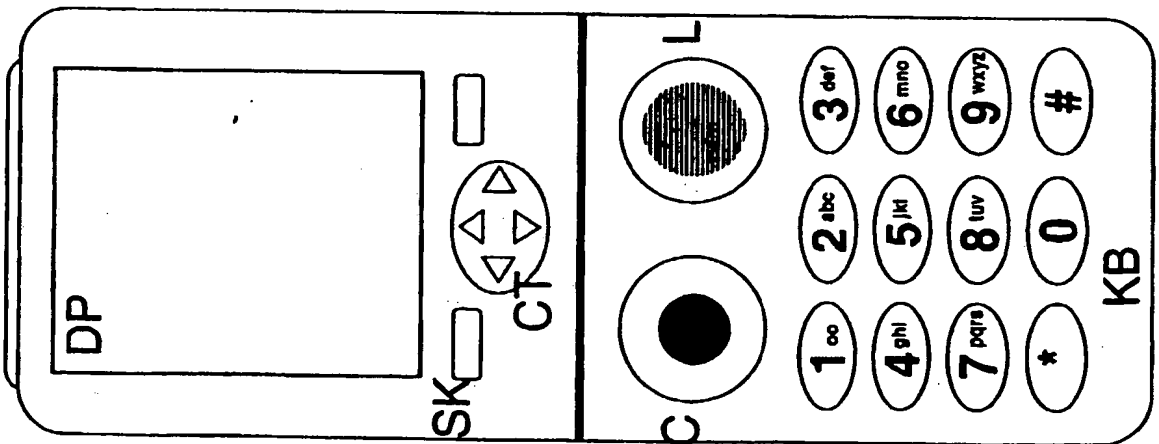


Fig. 2

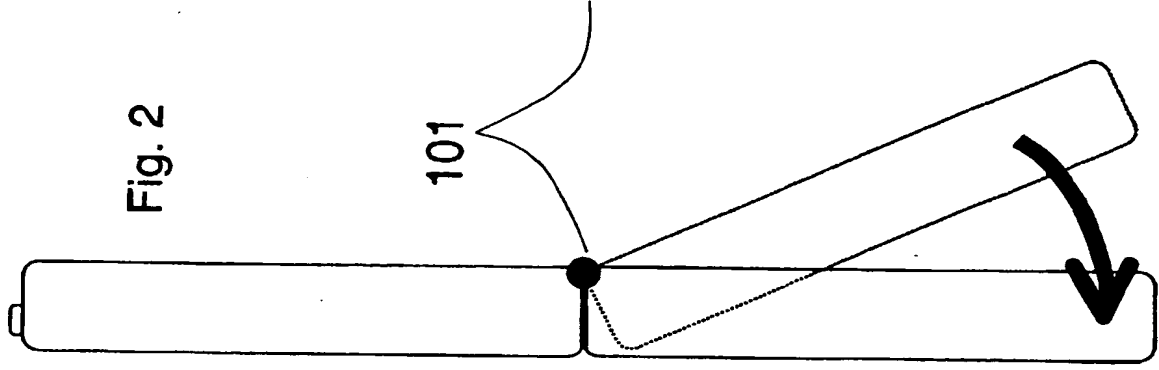
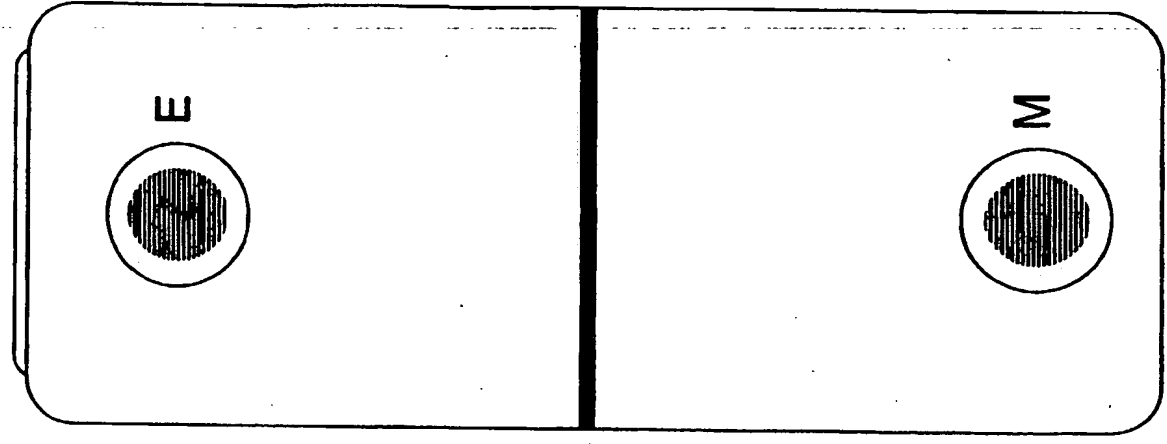


Fig. 3



Description

Foldable information technology unit

- 5 The invention relates to a foldable information technology unit, in particular a mobile telephone or a Personal Digital Assistant (known as a PDA) with a keyboard and a display.

Such devices become ever smaller with each new product generation
10 because, the smaller and lighter these devices are, the less trouble they are to users. This ongoing miniaturization of the devices presents problems however because on the other hand users expect to have a keyboard that is as easy as possible to use and thus not too small and a display device (display, monitor) that is
15 as large as possible. In addition the user frequently wishes to have a constant display of the device status, (e.g. as regards the state of charge of the battery, the receive signal strength, the time, the caller's name etc.) even when the device is in idle mode.

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Future mobile telephones and similar devices will also increasingly be equipped with cameras. These devices will basically be used for two purposes:

- 25 On one hand the user will use the camera to take individual pictures or sequences of pictures (video clips) of their surroundings and want to send these pictures together with short text messages to other mobile phone users or service companies (e.g. printers). For such applications it is advantageous if the
30 camera and the display are arranged on different, opposing surfaces of the device, so that the user can use the display device as a monitor while taking pictures of his surroundings with the camera.
- 35 On the other hand it is necessary with video telephony applications for the camera and the display devices to point in the same direction, namely in the direction of the user, so that

the latter can see the person to whom they are talking during the conversation and can simultaneously be recorded themselves by a camera.

5 Known solutions to this problem use a second display and/or a swivelling camera. Thus for example the P2101V mobile telephone made by Matsushita (Panasonic) is equipped with two Display devices and one camera which is integrated into a mechanism (hinge) to fold up the device.

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The disadvantage of these types of solution is that they involve a second display with higher costs compared to a single display and the volume and/or the weight of the device increases. The same applies to a swivelling camera integrated into the hinge. Over and
15 above this, this type of camera construction brings obvious mechanical problems with it.

This invention aims to improve and in particular find a solution to at least a part of these problems.

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This problem is solved by a foldable information technology device according to Claim 1.

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Advantageous further developments of the invention can be found in the subclaims.

The invention is described below using the figures. These show

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Fig. 1 a purely schematic representation of a preferred form of embodiment of the device in accordance with the invention from a first angle of view,

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Fig. 2 a purely schematic representation of a preferred form of embodiment of the device in accordance with the invention from a second angle of view and

Fig. 3 a purely schematic representation of a preferred form of embodiment of the device in accordance with the invention from a third angle of view.

- 5 As shown in Figure 1, the device possesses a display (DP) and an input device (KB) for characters (keyboard). These two devices are arranged on two different parts of the casing that are connected via a hinge (101) or an equivalent rotatable attachment device.
- 10 As shown in Figure 2 the device can be closed (folded) by turning the hinge (101), whereby it assumes a very compact form when compared to its unfolded state. In accordance with the invention the display (DP) and the keyboard (KB) are on the exterior of the relevant casing sections, i.e. located on the surfaces that form
- 15 the exterior surfaces of the device when it is closed.

- Through this measure the device is also fully operable in its folded (closed) state, i.e. the keyboard (KB) is available for entries and user can read status displays or other information
- 20 from the display (DP) at any time. As can be seen from these explanations and from Figure 1, the success at which the invention is aiming does not absolutely depend on the complete keyboard or any suitable operating element for input being accommodated on the part of the casing. Naturally it would generally be advantageous
- 25 to only have the display device, or as well as the display device further controls such as for example what are known as softkeys (SK) or cursor keys (CT) accommodated on one part of the casing since in general as large a display as possible is wanted.

- 30 Softkeys, that is control elements for which the current context-dependent meaning depends one of the instantaneous operating state of the device and which is therefore normally displayed adjacent to this control element on the display (DP) and cursor keys, that is control elements with which the cursor, i.e. a movable object
- 35 on the display device can be controlled by the user of the device, are particularly suited to being accommodated along with the

display on one part of the casing since their operation naturally requires simultaneous reading from the display.

The basic idea of the invention, of dividing up the display and the keyboard on the exterior surface of the casing in such a way that the described controls are available unrestricted when the device is in both its folded and unfolded state, can be realized by an expert using the description given here in different ways, depending on the application.

In a preferred form of embodiment of the invention a camera (C) is arranged on a different part of the casing to the display device (DP) and is arranged so that the display device and the camera are opposite to each other on different exterior surfaces of the device when it is folded up. Through this measure, which is illustrated By looking at figures 1 and 2 together, the user has the opportunity of selecting between (at least) two operating modes of the device that are well suited in different ways, depending on the type of application.

In the folded state of the device the camera (C) and display (DP) point in different directions at 180 degrees to each other so that the user sees in the display, if this is operating as a monitor for a camera, those parts of his surroundings in front of him that the camera is currently recording. This operating mode of course is part of the normal use as a camera for recording landscapes or other people, in any event of scenes that are within the user's field of vision.

When the device in its unfolded state, camera and display point in the same direction. This operating mode is thus suitable for recording the user himself, in which case he can simultaneously see in the display himself or someone to whom he is talking, to whom he might be connected by a radio unit in the device (mobile telephone).

A further preferred form of embodiment of the invention thus makes provision for additionally accommodating a loudspeaker (L) on one of the outside surfaces of the device. This measure ensures that audible signals, e.g. ring tones of a mobile telephone integrated into the device, can be heard by the user for an incoming call even when the device is folded up, so that the latter can accept a call, e.g. by pressing an appropriate key. Here too the device in accordance with invention does not require the opening up (unfolding) of the device, since all controls are arranged on the outside surfaces.

In accordance with a further preferred embodiment of the invention, an earpiece (E) is provided that is accommodated on one of the internal surfaces of the device. Accommodating the earpiece on the external surface of the device would be of no benefit to the user since it is difficult to imagine applications in which he would not be necessary for the user to unfold the device before using it. This measure is particularly advantageous in connection with a further embodiment of the invention, in accordance with which a microphone (M) is accommodated on one of the internal surfaces of the device, so that in its unfolded state the device can be used in such a way that the earpiece (E) und microphone (M) each come as close as possible to an ear or the mouth of the user. In most cases this is achieved by arranging the earpiece (E) und microphone (M) each on the internal surfaces of two different parts of the casing, and in general more at the extreme positions (upper and lower end), the smaller the device dimensions are. This is a way, with small device dimensions, to get the earpiece (E) and microphone (M) as close as possible to an ear or the mouth of the user. This embodiment of the invention is shown in Figure 3.

Patent claims

1. Foldable information technology device, in particular mobile
telephone or Personal Digital Assistant with a keyboard (KB)
and display (DP) that are arranged on each of at least two
parts of the casing (GT1, GT2) of the device in such a way
that, when the casing is folded up, the two parts of the casing
connected by a hinge (101) or by an equivalent rotatable
attachment device assume a more compact form, on the opposite
exterior surfaces of which the display and the keyboard are
arranged and are accessible to the user.
2. Foldable information technology device in accordance with claim
1 in which the display (DP) is arranged on a first part of the
casing (GT1) and a camera is arranged on a second part of the
casing (GT2) so that display and camera are on opposite
exterior surfaces of the device when it is folded up.
3. Foldable information technology device in accordance with one
of the previous claims in which an earpiece is accommodated on
one of the internal surfaces of the casing.
4. Foldable information technology device in accordance with one
of the previous claims in which a microphone is accommodated on
one of the internal surfaces of the casing in such a way that
the device, in its unfolded state, allows use in which the
earpiece and microphone come as close as possible to an ear or
the mouth of the user.



INVESTOR IN PEOPLE

Application No: GB 0309751.6
Claims searched: 1 to 4

Examiner: Dan Hickery
Date of search: 30 June 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X,P	1	GB 2377592 A (NEC) fig.7,8
X,P	1	JP 2002/314657 A (NEC) fig.1,2
X,P	1	JP 2002/198849 A (TOSHIBA) fig.3,5,7
X,P	1	JP 2002/171324 A (TOOKADO) fig.3-5
X	1	KR 2001/028987 (SAMSUNG) WPI abs., fig.3,4

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^v:

H4J

Worldwide search of patent documents classified in the following areas of the IPC⁷:

H04M

The following online and other databases have been used in the preparation of this search report:

EPODOC, JAPIO, WPI

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